

WHAT IS CLAIMED IS:

1. An image forming apparatus in which  
5 applications can be installed, the image forming  
apparatus comprising:  
an application information obtaining part for  
obtaining application information that is used for  
determining whether an application is installable in  
10 the image forming apparatus..

15 2. The image forming apparatus as claimed in  
claim 1, wherein the application information obtaining  
part obtains the application information from the  
application.

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3. The image forming apparatus as claimed in  
claim 2, wherein the application information is  
25 information that is included in an execution file of

the application.

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4. The image forming apparatus as claimed in claim 1, wherein the application information obtaining part obtains the application information from a file separate from the application.

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5. The image forming apparatus as claimed in claim 3, wherein the application information obtaining part obtains the application information by provisionally launching the application.

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6. The image forming apparatus as claimed in claim 5, wherein the application information obtaining part obtains the application information by using interprocess communication between the application

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information obtaining part and the application.

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7. The image forming apparatus as claimed in claim 5, wherein the application causes the image forming apparatus to perform:

a step of determining whether to  
10 provisionally launch the application or to normally launch the application according to a request from the application information obtaining part; and

a step of providing the application  
information to the application information obtaining  
15 part if the application is provisionally launched.

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8. The image forming apparatus as claimed in claim 1, the image forming apparatus further comprising a storage for storing the application information obtained by the application information obtaining part.

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9. The image forming apparatus as claimed in claim 8, wherein the storage is at least one of a hard  
5 disk, a nonvolatile memory and a memory card, and wherein the application information obtaining part obtains the application information by reading information stored in the storage.

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10. The image forming apparatus as claimed in claim 1, wherein the application information includes a  
15 product ID that is specific for the application.

20 11. The image forming apparatus as claimed in claim 10, wherein the application information further includes at least one of a vendor name, an application name, version information and resource information.

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12. The image forming apparatus as claimed in  
claim 10, wherein the storage stores product IDs of  
5 installable applications, and the image forming  
apparatus determines whether a target application is  
installable by checking whether a product ID of the  
target application is stored.

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13. The image forming apparatus as claimed in  
claim 1, the image forming apparatus further  
15 comprising:

hardware resources used for image forming  
process;

control services for controlling the hardware  
resources; and

20 a virtual application service that operates  
as a client process for the control services and  
operates as a sever process for the application.

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14. The image forming apparatus as claimed in claim 13, wherein the virtual application service includes the application information obtaining part.

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15. A method used in an image forming apparatus in which applications can be installed, the method comprising:

an application information obtaining step of obtaining application information that is used for determining whether an application is installable in the image forming apparatus.

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16. The method as claimed in claim 15, wherein the image forming apparatus obtains the application information from the application.

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17. The method as claimed in claim 16,  
wherein the application information is information that  
is included in an execution file of the application.

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18. The method as claimed in claim 15,  
10 wherein the image forming apparatus obtains the  
application information from a file separate from the  
application.

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19. The method as claimed in claim 17,  
wherein the image forming apparatus obtains the  
application information by provisionally launching the  
20 application.

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20. The method as claimed in claim 19,

wherein the image forming apparatus obtains the application information from the application by using interprocess communication.

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21. The method as claimed in claim 19,  
wherein the application causes the image forming  
10 apparatus to perform:  
a step of determining whether to  
provisionally launch the application or to normally  
launch the application according to a request; and  
a step of providing the application  
15 information to the image forming apparatus if the  
application is provisionally launched.

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22. The method as claimed in claim 15, the  
method further comprising a step of storing the  
application information in a storage in the image  
forming apparatus.

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23. The method as claimed in claim 22,  
5 wherein the storage is at least one of a hard disk, a  
nonvolatile memory and a memory card, and wherein the  
image forming apparatus obtains the application  
information by reading information stored in the  
storage.

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24. The method as claimed in claim 15,  
15 wherein the application information includes a product  
ID that is specific for the application.

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25. The method as claimed in claim 24,  
wherein the application information further includes at  
least one of a vendor name, an application name,  
version information and resource information.

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26. The method as claimed in claim 24,  
5 wherein the storage stores product IDs of installable  
applications, and the image forming apparatus  
determines whether a target application is installable  
by checking whether a product ID of the target  
application is stored.

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27. A computer program to be executed on an  
15 image forming apparatus in which applications can be  
installed, the computer program comprising:

application information obtaining program  
code means for obtaining application information that  
is used for determining whether an application is  
20 installable in the image forming apparatus.

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28. A computer readable medium storing

program code to be executed on an image forming apparatus in which applications can be installed, the computer readable medium comprising:

application information obtaining program  
5 code means for obtaining application information that is used for determining whether an application is installable in the image forming apparatus.

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29. An image forming apparatus including an operation panel for displaying or inputting operation information, the image forming apparatus comprising:

15 an information obtaining part for obtaining application information on an application to be used in the image forming apparatus; and

a display part for displaying the application information or information related to the application  
20 information on the operation panel.

25 30. The image forming apparatus as claimed in

claim 29, the image forming apparatus further comprising:

a determination part for determining whether the application is installable in the image forming apparatus according to the application information  
5 obtained by the information obtaining part.

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31. The image forming apparatus as claimed in claim 30, wherein the display part displays one or more installable applications on the operation panel according to the result of determination by the  
15 determination part, wherein an installable application can be selected from the one or more installable applications.

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32. The image forming apparatus as claimed in claim 31, wherein the display part displays information including application names and application outline  
25 descriptions for the one or more applications.

5           33. The image forming apparatus as claimed in  
claim 30, wherein the display part displays a reason  
why an application is not installable according to the  
result of determination by the determination part.

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          34. The image forming apparatus as claimed in  
claim 30, wherein the display part displays a warning  
15 when an application selected for install is already  
installed in the image forming apparatus.

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          35. The image forming apparatus as claimed in  
claim 29, wherein the application information or the  
information related to the application information that  
is displayed on the operation panel includes  
25 information necessary for determining whether the

application is installable.

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36. The image forming apparatus as claimed in claim 35, wherein the information necessary for determining whether the application is installable includes version information of the application and  
10 version information of the image forming apparatus.

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37. The image forming apparatus as claimed in claim 35, wherein the information necessary for determining whether the application is installable includes necessary resource information of the application and available resource information of the  
20 image forming apparatus.

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38. The image forming apparatus as claimed in

claim 29, wherein the display part displays an install operation screen or an uninstall operation screen by using the application information,

the image forming apparatus further

5 comprising:

a part for performing install process or uninstall process for the application according to operations on the install operation screen or the uninstall operation.

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39. The image forming apparatus as claimed in claim 29, the image forming apparatus further comprising a part for causing a remote apparatus to display a screen that is the same as a screen displayed on the operation panel.

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40. A method used for displaying operation information on an operation panel in an image forming apparatus, the image forming apparatus comprising:

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an information obtaining step of obtaining application information on an application to be used in the image forming apparatus; and

a display step of displaying the application information or information related to the application information on the operation panel.

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41. The method as claimed in claim 40, the method further comprising:

a determination step of determining whether the application is installable in the image forming apparatus according to the application information.

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42. The method as claimed in claim 41, wherein the image forming apparatus displays one or more installable applications on the operation panel according to the result of the determination step, wherein an installable application can be selected from the one or more installable applications.

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5           43. The method as claimed in claim 42,  
wherein the image forming apparatus displays  
information including application names and application  
outline descriptions for the one or more applications.

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          44. The method as claimed in claim 41,  
wherein the image forming apparatus displays a reason  
15 why an application is not installable according to the  
result of the determination step.

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          45. The method as claimed in claim 41,  
wherein the image forming apparatus displays a warning  
when an application selected for install is already  
installed in the image forming apparatus.

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46. The method as claimed in claim 40,  
5 wherein the application information or the information  
related to the application information that is  
displayed on the operation panel includes information  
necessary for determining whether the application is  
installable.

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47. The method as claimed in claim 46,  
15 wherein the information necessary for determining  
whether the application is installable includes version  
information of the application and version information  
of the image forming apparatus.

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48. The method as claimed in claim 46,  
wherein the information necessary for determining  
25 whether the application is installable includes

necessary resource information of the application and  
available resource information of the image forming  
apparatus.

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49. The method as claimed in claim 40,  
wherein the image forming apparatus displays an install  
10 operation screen or an uninstall operation screen by  
using the application information,

wherein the image forming apparatus performs  
install process or uninstall process for the  
application according to operations on the install  
15 operation screen or the uninstall operation.

20 50. The method as claimed in claim 40,  
wherein the image forming apparatus causes a remote  
apparatus to display a screen that is the same as a  
screen displayed on the operation panel.

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51. A computer program to be executed on an  
image forming apparatus including an operation panel  
5 for displaying or inputting operation information, the  
computer program comprising:

information obtaining program code means for  
obtaining application information on an application to  
be used in the image forming apparatus; and

10 display program code means for displaying the  
application information or information related to the  
application information on the operation panel.

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52. A computer readable medium storing  
program code to be executed on an image forming  
apparatus including an operation panel for displaying  
20 or inputting operation information, the computer  
readable medium comprising:

information obtaining program code means for  
obtaining application information on an application to  
be used in the image forming apparatus; and

25 display program code means for displaying the

application information or information related to the  
application information on the operation panel.

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53. An image forming apparatus in which a  
plurality of applications can be installed, the image  
forming apparatus comprising:

10            an information obtaining part for obtaining  
necessary resource information for executing an  
application and available resource information in the  
image forming apparatus; and

             a launch restriction part for comparing the  
15    necessary resource information and the available  
resource information, and performing launch restriction  
process on the application according to the result of  
comparison between the necessary resource information  
and the available resource information.

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54. The image forming apparatus as claimed in  
25    claim 53, wherein the information obtaining part

obtains the necessary resource information from an  
execution file of the application.

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55. The image forming apparatus as claimed in  
claim 54, wherein the information obtaining part  
obtains the necessary resource information by  
10 provisionally launching the application.

15 56. The image forming apparatus as claimed in  
claim 53, wherein the information obtaining part  
obtains, as the necessary resource information, a usage  
record of a resource used by the application.

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57. The image forming apparatus as claimed in  
claim 56, wherein the information obtaining part  
25 obtains the usage record from system information that

holds usage records used by processes in the image forming apparatus.

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58. The image forming apparatus as claimed in claim 53, wherein the information obtaining part obtains, as the necessary resource information, a  
10 memory area size to be used by the application.

15 59. The image forming apparatus as claimed in claim 58, wherein the memory area size is a heap area size.

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60. The image forming apparatus as claimed in claim 53, wherein the necessary resource information indicates a necessary resource amount and the available  
25 resource information indicates an available resource

amount, and wherein the launch restriction part displays a ratio of the necessary resource amount to the available resource amount on an operation panel.

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61. The image forming apparatus as claimed in claim 53, wherein the necessary resource information indicates a necessary resource amount and the available resource information indicates an available resource amount, and wherein the launch restriction part displays a warning on an operation panel when the necessary resource amount is larger than the available resource amount.

20 62. The image forming apparatus as claimed in claim 61, wherein, if the application can operate by using a second resource that is different from a first resource corresponding to the necessary resource amount, the launch restriction part causes the application to  
25 use the second resource instead of the first resource.



5           63. The image forming apparatus as claimed in  
claim 53, wherein the necessary resource information  
indicates an apparatus that is to be used by the  
application, and wherein the launch restriction part  
performs the launch restriction process when the image  
10 forming apparatus is not provided with the apparatus.

15           64. The image forming apparatus as claimed in  
claim 53, the image forming apparatus further  
comprising:

hardware resources used for image forming  
processes;

20           control services for controlling the hardware  
resources; and

a virtual application service that operates  
as a client process for the control services and  
operates as a sever process for the application.

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65. The image forming apparatus as claimed in  
5 claim 64, wherein the virtual application service  
includes the information obtaining part and the use  
restriction part.

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66. A launch restriction method used in an  
image forming apparatus in which a plurality of  
applications can be installed, the launch restriction  
15 method comprising:

an information obtaining step of obtaining  
necessary resource information for executing an  
application and available resource information in the  
image forming apparatus; and

20 a launch restriction step of comparing the  
necessary resource information and the available  
resource information, and performing launch restriction  
process on the application according to the result of  
comparison between the necessary resource information  
25 and the available resource information.

5           67. The launch restriction method as claimed  
in claim 66, wherein the image forming apparatus  
obtains the necessary resource information from an  
execution file of the application.

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          68. The launch restriction method as claimed  
in claim 67, wherein the image forming apparatus  
15 obtains the necessary resource information from the  
execution file of the application by provisionally  
launching the application.

20

          69. The launch restriction method as claimed  
in claim 66, wherein the image forming apparatus  
obtains, as the necessary resource information, a usage  
25 record of a resource used by the application.

5           70. The launch restriction method as claimed  
in claim 69, wherein the image forming apparatus  
obtains the usage record from system information that  
holds usage records used by processes in the image  
forming apparatus.

10

          71. The launch restriction method as claimed  
15 in claim 66, wherein the image forming apparatus  
obtains, as the necessary resource information, a  
memory area size to be used by the application.

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          72. The launch restriction method as claimed  
in claim 71, wherein the memory area size is a heap  
area size.

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73. The launch restriction method as claimed  
5 in claim 66, wherein the necessary resource information  
indicates a necessary resource amount and the available  
resource information indicates an available resource  
amount, and wherein the image forming apparatus  
displays a ratio of the necessary resource amount to  
10 the available resource amount on an operation panel.

15 74. The launch restriction method as claimed  
in claim 66, wherein the necessary resource information  
indicates a necessary resource amount and the available  
resource information indicates an available resource  
amount, and wherein the image forming apparatus  
20 displays a warning on an operation panel when the  
necessary resource amount is larger than the available  
resource amount.

75. The launch restriction method as claimed  
in claim 74, wherein, if the application can operate by  
using a second resource that is different from a first  
5 resource corresponding to the necessary resource amount,  
the image forming apparatus causes the application to  
use the second resource instead of the first resource.

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76. The launch restriction method as claimed  
in claim 66, wherein the necessary resource information  
indicates an apparatus that is to be used by the  
15 application, and wherein the image forming apparatus  
performs the launch restriction process when the image  
forming apparatus is not provided with the apparatus.

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77. The launch restriction method as claimed  
in claim 66, the image forming apparatus comprising:  
hardware resources used for image forming  
25 processes;

control services for controlling the hardware resources; and

a virtual application service that operates as a client process for the control services and  
5 operates as a sever process for the application.

10 78. The launch restriction method as claimed in claim 77, wherein information obtaining step and the launch restriction step are performed by the virtual application service.

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79. A computer program to be executed on an image forming apparatus in which a plurality of  
20 applications can be installed, the computer program comprising:

information obtaining program code means for obtaining necessary resource information for executing an application and available resource information in  
25 the image forming apparatus; and

launch restriction program code means for  
comparing the necessary resource information and the  
available resource information, and performing launch  
restriction process on the application according to the  
5 result of comparison between the necessary resource  
information and the available resource information.

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80. A computer readable medium storing  
program code to be executed on an image forming  
apparatus in which a plurality of applications can be  
installed, the computer readable medium comprising:  
15 information obtaining program code means for  
obtaining necessary resource information for executing  
an application and available resource information in  
the image forming apparatus; and

launch restriction program code means for  
20 comparing the necessary resource information and the  
available resource information, and performing launch  
restriction process on the application according to the  
result of comparison between the necessary resource  
information and the available resource information.

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81. An image forming apparatus in which a  
5 plurality of applications can be installed, the image  
forming apparatus comprising:

a part for referring to a database which  
includes, for each application, information on  
propriety of combination of applications; and

10 a launch control part for performing launch  
control process on an application according to the  
information on propriety.

15

82. The image forming apparatus as claimed in  
claim 81, wherein the information on propriety  
indicates incompatible relationship or unrecommended  
20 relationship among a plurality of applications, and  
the launch control part displays a screen for  
selecting at least one application from among the  
plurality of applications on an operation panel.

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83. The image forming apparatus as claimed in  
claim 81, wherein the information on propriety  
5 indicates incompatible relationship or unrecommended  
relationship among a plurality of applications, and  
the launch control part launches at least one  
application among the plurality of applications or  
performs launch setting on at least one application  
10 among the plurality of applications.

15 84. The image forming apparatus as claimed in  
claim 83, wherein the launch control part launches an  
application having the highest priority among the  
plurality of applications or performs launch setting on  
the application having the highest priority.

20

85. The image forming apparatus as claimed in  
25 claim 81, wherein the information on propriety

indicates incompatible relationship or unrecommended  
relationship among a plurality of applications, and  
the lunch control part displays a warning  
screen on an operation panel when combination of  
5 applications is unrecommended.

10 86. The image forming apparatus as claimed in  
claim 82, wherein, when a launch request or a launch  
setting request is made for a first application, the  
launch control part refers to the database, obtains an  
identifier of a second application that is incompatible  
15 or unrecommended against the first application, and  
performs the launch control process on the first and  
second applications.

20

87. The image forming apparatus as claimed in  
claim 81, wherein the information on propriety  
indicates incompatible relationship or unrecommended  
25 relationship among a plurality of applications, and

indicates a level of the incompatible relationship or the unrecommended relationship, and

the launch control part performs the launch control process according to the level.

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88. The image forming apparatus as claimed in claim 81, wherein the information on propriety indicates indispensable relationship or recommended relationship among a plurality of applications, and

the launch control part displays a screen showing an indispensable or recommended application for another application on an operation panel.

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89. The image forming apparatus as claimed in claim 81, wherein the information on propriety indicates indispensable relationship or recommended relationship among a plurality of applications, and

the launch control part launches an indispensable or recommended application for another

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application, or performs launch setting on the indispensable or recommended application for another application.

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90. The image forming apparatus as claimed in claim 88, wherein, when the indispensable or recommended application is not installed in the image forming apparatus, the launch control part downloads the indispensable or recommended application from a server via a network.

15

91. The image forming apparatus as claimed in claim 88, wherein, when the indispensable or recommended application is not installed in the image forming apparatus, the launch control part displays information that can be used for obtaining the indispensable or recommended application.

25

92. The image forming apparatus as claimed in claim 88, wherein, when a launch request or a launch  
5 setting request is made for a first application, the launch control part refers to the database, obtains an identifier of a second application that is indispensable or recommended for the first application, and performs the launch control process on the first  
10 and second applications.

15 93. The image forming apparatus as claimed in claim 81, wherein the information on propriety indicates indispensable relationship or recommended relationship among a plurality of applications, and indicates a level of the indispensable relationship or  
20 the recommended relationship, and  
the launch control part performs the launch control process according to the level.

94. The image forming apparatus as claimed in claim 81, the image forming apparatus further comprising:

5 hardware resources used for image forming processes;

control services for controlling the hardware resources; and

10 a virtual application service that operates as a client process for the control services and operates as a sever process for the application.

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95. The image forming apparatus as claimed in claim 94, wherein the virtual application service includes the part for referring and the launch control part.

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96. A launch control method used in an image forming apparatus in which a plurality of applications

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can be installed, the launch control method comprising:

a step of referring to a database which includes, for each application, information on propriety of combination of applications; and

5 a launch control step of performing launch control process on an application according to the information on propriety.

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97. The launch control method as claimed in claim 96, wherein the information on propriety indicates incompatible relationship or unrecommended  
15 relationship among a plurality of applications, and the image forming apparatus displays a screen for selecting at least one application from among the plurality of applications on an operation panel.

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98. The launch control method as claimed in claim 96, wherein the information on propriety  
25 indicates incompatible relationship or unrecommended



relationship among a plurality of applications, and  
the image forming apparatus launches at least  
one application among the plurality of applications or  
performs launch setting on at least one application  
5 among the plurality of applications.

10 99. The launch control method as claimed in  
claim 98, wherein the image forming apparatus launches  
an application having the highest priority among the  
plurality of applications or performs launch setting on  
the application having the highest priority.

15

100. The launch control method as claimed in  
20 claim 96, wherein the information on propriety  
indicates incompatible relationship or unrecommended  
relationship among a plurality of applications, and  
the image forming apparatus displays a  
warning screen on an operation panel when combination  
25 of applications is unrecommended.

5                   101. The launch control method as claimed in  
claim 97, wherein, when a launch request or a launch  
setting request is made for a first application, the  
image forming apparatus refers to the database, obtains  
an identifier of a second application that is  
10 incompatible or unrecommended against the first  
application, and performs the launch control process on  
the first and second applications.

15

                  102. The launch control method as claimed in  
claim 96, wherein the information on propriety  
indicates incompatible relationship or unrecommended  
20 relationship among a plurality of applications, and  
indicates a level of the incompatible relationship or  
the unrecommended relationship, and

                  the image forming apparatus performs the  
launch control process according to the level.

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103. The launch control method as claimed in  
5 claim 96, wherein the information on propriety  
indicates indispensable relationship or recommended  
relationship among a plurality of applications, and  
the image forming apparatus displays a screen  
showing an indispensable or recommended application for  
10 another application on an operation panel.

15 104. The launch control method as claimed in  
claim 96, wherein the information on propriety  
indicates indispensable relationship or recommended  
relationship among a plurality of applications, and  
the image forming apparatus launches an  
20 indispensable or recommended application for another  
application, or performs launch setting on the  
indispensable or recommended application for another  
application.

105. The launch control method as claimed in  
claim 103, wherein, when the indispensable or  
5 recommended application is not installed in the image  
forming apparatus, the image forming apparatus  
downloads the indispensable or recommended application  
from a server via a network.

10

106. The launch control method as claimed in  
claim 103, wherein, when the indispensable or  
15 recommended application is not installed in the image  
forming apparatus, the image forming apparatus displays  
information that can be used for obtaining the  
indispensable or recommended application.

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107. The launch control method as claimed in  
claim 103, wherein, when a launch request or a launch  
25 setting request is made for a first application, the

image forming apparatus refers to the database, obtains  
an identifier of a second application that is  
indispensable or recommended for the first application,  
and performs the launch control process on the first  
5 and second applications.

10 108. The launch control method as claimed in  
claim 96, wherein the information on propriety  
indicates indispensable relationship or recommended  
relationship among a plurality of applications, and  
indicates a level of the indispensable relationship or  
15 the recommended relationship, and

the image forming apparatus performs the  
launch control process according to the level.

20

109. The launch control method as claimed in  
claim 96, the image forming apparatus comprising:  
hardware resources used for image forming  
25 processes;

control services for controlling the hardware resources; and

a virtual application service that operates as a client process for the control services and  
5 operates as a sever process for the application.

10 110. The launch control method as claimed in claim 109, wherein the step of referring to the database and the launch control step are performed by the virtual application service.

15

111. A computer program to be executed on an image forming apparatus in which a plurality of  
20 applications can be installed, the computer program comprising:

program code means for referring to a database which includes, for each application, information on propriety of combination of  
25 applications; and

launch control program code means for performing launch control process on an application according to the information on propriety.

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112. A computer readable medium storing program code to be executed on an image forming apparatus in which a plurality of applications can be installed, the computer readable medium comprising:

program code means for referring to a database which includes, for each application, information on propriety of combination of applications; and

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launch control program code means for performing launch control process on an application according to the information on propriety.

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